

"Swimming" in Numbers

Purpose

Students will use calculators and spreadsheet software to determine the area, volume, and mass of real-world objects.

Materials

For the teachers: chalk, chalkboard

For the students: access to spreadsheet software, calculators, science journals, copies of the BLM *Swimming in Numbers*

Activity

A. Pre-Activity Preparation

1. Prepare a blank spreadsheet that the students will use to practice this concept later. The spreadsheet should have places for the students to input the dimensions of an object. Then, insert the formulas for area and volume into the spreadsheet. Also include a formula for the mass of the water in the pool (see BLM).

B. Pre-Activity Discussion

1. Teach the formulas for figuring the area of a rectangle and a triangle.
Area of a rectangle = length x width
Area of a triangle = $1/2$ (base x height)
2. Discuss some practical examples of using these formulas (i.e. finding out how much paint you need to cover the walls).
3. Have the students copy the formulas into their science journals.
4. Discuss the formulas for figuring volume and again have students copy the formulas.
Rectangular prism = length x width x height
Pyramid = $1/3$ (base x height)
5. Discuss practical examples for volume (i.e. finding how much water it will take to fill a swimming pool).
6. Discuss that mass is basically the weight of an object. If the object is too large to weigh, as in a swimming pool, you have to use the volume to find out the weight.

C. Description of Activity

1. Pass out copies of the BLM and have the students complete the answers using calculators.

Technology Literacy Standards

	I	II	III	IV	V	VI	VII
1	X	X					
2	X	X					
3				X			
4	X						
5							
6		X		X			
7							
8							
9							
10							
11				X			
12							
13							
14							
15							
16							

X = This Technology Literacy Standard is addressed in this lesson.

= This Technology Literacy Standard is not addressed in this lesson.

2. Have the students open the spreadsheet that the teacher previously created and input the dimensions of the objects from the BLM. Point out that the formulas for area, volume, and mass have already been inserted for them. The students should use the spreadsheet data to check their answers on their BLM worksheet.

D. Close the Activity

1. Discuss the results and find out how many students were able to figure the area, volume, and mass correctly before entering the data into the spreadsheet.
2. If you wish to extend the activity, have the students create their own drawings of a pyramid, including the dimensions of all the sides. Then have them figure the area and volume of the pyramid.

Classroom Assessment ---

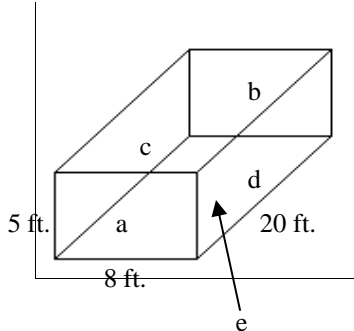
Examine the students' BLM worksheets for accuracy and remediate as necessary. Assess the students' pyramids, if you choose to do that extension activity.

Name: _____



Swimming in Numbers

Good news! You are having a pool installed in your back yard! Now you have to figure out the area of the pool, so that you can buy the right liner for the sides and bottom.



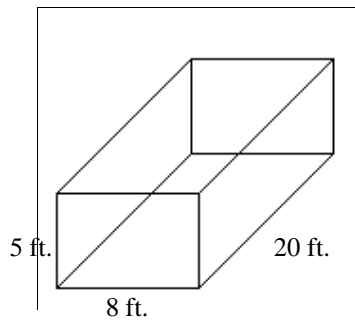
Area = length x width

You have 5 rectangles that will need covered with the liner—the 4 sides (sides “a-d”) and the bottom (side “e”). Figure out the area for each side and then add them together to get the total area.

Side a _____ x _____ = _____ ft.²
Side b _____ x _____ = _____ ft.²
Side c _____ x _____ = _____ ft.²
Side d _____ x _____ = _____ ft.²
Bottom e _____ x _____ = _____ ft.²

Total Area: _____ ft.²

Now, of course, you need some water. It is going to be easier to hire a truck to come out and fill up your pool, but they want to know how much water to bring. For this, you need to figure out the volume of your pool.



Volume = length x width x height

_____ x _____ x _____ = _____ ft.³

You also need to make sure that you are going to be able to support the weight of all that water! If ONE cubic foot of water weighs 62.4 pounds, how much will all of the water weigh?

Answer: _____ pounds

Swimming in Numbers

Answer Key

Area = length x width

$$\begin{array}{lclclcl} \text{Side a} & \underline{5} & \times & \underline{8} & = & \underline{40} \text{ ft.}^2 \\ \text{Side b} & \underline{5} & \times & \underline{8} & = & \underline{40} \text{ ft.}^2 \\ \text{Side c} & \underline{5} & \times & \underline{20} & = & \underline{100} \text{ ft.}^2 \\ \text{Side d} & \underline{5} & \times & \underline{20} & = & \underline{100} \text{ ft.}^2 \\ \text{Bottom e} & \underline{8} & \times & \underline{20} & = & \underline{160} \text{ ft.}^2 \\ & & & \text{Total Area:} & & \underline{440} \text{ ft.}^2 \end{array}$$

Volume = length x width x height

$$\underline{8} \times \underline{5} \times \underline{20} = \underline{800} \text{ ft.}^3$$

You also need to make sure that you are going to be able to support the weight of all that water!
If ONE cubic foot of water weighs 62.4 pounds, how much will all of the water weigh?

Answer: 49,920 pounds